

IX. PORIFERA.

By ARTHUR DENDY.

Only a single Sponge was brought home by H.M.S. 'Flying-Fish,' but this specimen is one of considerable interest. It belongs to a new species of Schmidt's genus *Pachychalina*¹. It is only very rarely that specimens of Chalinine Sponges come to hand in a sufficiently well-preserved condition to allow of an investigation into the structure of the soft tissues. Such investigation is likely to prove of much importance in determining the true relations of this large and difficult group of Sponges. Hence, as no account has ever yet been given of the minute anatomy of any species of *Pachychalina*, and, as indeed, only one or two Chalinine Sponges have been anatomically described at all, I have thought it desirable to give some description of the minute anatomy of the present species—a proceeding rendered practicable by the excellent state of preservation of the specimen.

PACHYCHALINA SPINOSISSIMA, n. sp. (Plate XLIV.)

The single specimen in the Collection (Plate XLIV. fig. 1) consists of a long, unbranched, irregularly cylindrical, repent stem, naturally terminating at each end. The specimen has evidently been attached by various parts of the lower surface to the sea-bottom. It is covered all over with very large, stout, sharp-pointed, and often branching spines (whence the specific name), and bears along the upper surface a row of large oscula. Total length of specimen about 350 millim. (=14 inches); average diameter, exclusive of spines, 12 millim.; average length of spines, 10 millim. *Colour* in spirit brownish yellow. *Texture* compressible, elastic, tough, internally cavernous. *Surface* subglabrous over and between the spines. *Dermal membrane* (ectosome) very thin, delicate, and transparent, reduced to a mere network by the very numerous pores (Plate XLIV. fig. 2). *Pores* very numerous rounded openings, thickly scattered through the dermal membrane, averaging about 0·05 millim. in diameter (Plate XLIV. fig. 2). *Oscula* circular, pit-like openings, having their margins flush with the general surface; averaging in diameter about 3 millim.; arranged in a single series along the upper surface of the sponge (Plate XLIV. fig. 1).

Skeleton.—(a) Main: a coarse, irregular, wide-meshed reticulation of stout spiculo-fibre, in which there is a strongly developed but rather irregular system of fibres running more or less longitudinally in the direction of the long axis of the sponge. The fibres themselves are, as in other species of the genus, stout and polyspiculous; each consists of a stout spicular axis, composed of very numerous, closely packed spicules lying side by side parallel with one another, and a large proportion of spongin, which unites the spicules together, and, generally at any rate, also forms a distinct sheath around the

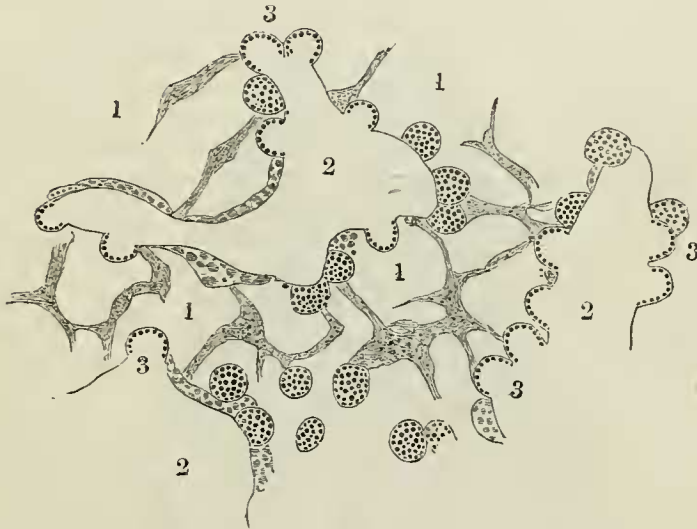
¹ *Vide* Ridley and Dendy, Report on the Monaxonida dredged by H.M.S. 'Challenger,' p. 19, for diagnosis and discussion of the genus.

spicular axis. The diameter of the fibres varies much, averaging, say, about 0·12 millim. There are also numerous spicules outside the fibres, scattered loosely and irregularly through the choanosome. (b) Dermal: a very well-developed reticulation of stout spiculo-fibre, branching and anastomosing in such a manner as to give rise to a number of irregularly polygonal meshes. These coarser meshes are further subdivided by a much finer, unispicular, or sub-unispicular reticulation (Plate XLIV. fig. 2), lying at a slightly higher level.

Spicules.—Slightly curved oxea (Plate XLIV. fig. 3), sharply and fairly gradually pointed at each end; size of full-grown spicules about 0·16 by 0·009 millim.

Canal-System.—The canal-system is lacunar, and referable to Dr. Vosmaer's third type¹. The pores (*vide supra*) lead into

Fig. 6.



Pachychalina spinosissima; portion of a vertical longitudinal section, showing (1) the inhalant lacunæ incompletely subdivided by strands of mesodermal tissue, (2) the exhalant lacunæ, and (3) the subspherical flagellated chambers opening into the exhalant lacunæ by means of wide mouths.

irregularly shaped subdermal cavities, lying immediately beneath the dermal membrane. Many pores lead into each of the subdermal cavities, which are merely the proximal extremities of a system of ramifying inhalant lacunæ, leading to the flagellated chambers.

The ultimate ramifications of the inhalant lacunæ are very peculiar, consisting of a system of spaces lying amongst and around the exhalant lacunæ, and themselves incompletely subdivided by numerous delicate strands of mesodermal tissue, which, branching and anastomosing, run across and across, from wall to wall (*vide woodcut*, fig. 6).

¹ Bronn's Klass. u. Ordn. d. Thierreichs, Porifera, p. 130.

The exhalant canal-system also consists of a series of more or less lacunar spaces, opening into one another, and finally discharging on to the surface through the oscula; their ultimate ramifications are of comparatively large size, and are readily distinguished from the ultimate inhalant lacunæ by two important characters: (i.) they are not subdivided by strands of mesodermal tissue; (ii.) they are very definitely bounded, and are surrounded by the flagellated chambers.

The flagellated chambers, clustered around the exhalant lacunæ, open directly into the latter by means of wide mouths, as shown in the accompanying woodcut. There are no cameral canaliculi. The proximal portion of each flagellated chamber appears, in the present condition of the sponge, to project freely into the lumen of the inhalant lacuna, in such a manner that it would be completely immersed in the incurrent stream of water; this appearance, however, is probably in part due to the shrinking away of the surrounding tissues owing to the action of the spirit in which the specimen was preserved. In form the chambers are subspherical, and they are very small, measuring only about 0.02 millim. in diameter.

It is important to notice that the canal-system thus described agrees essentially with that of the few other genera of *Halichondrina* whose canal-system is as yet known to us. Minor differences, which are likely to be of considerable importance for systematic purposes, certainly exist in the arrangement of the canal-systems of these different genera; thus in the species under consideration the structure and arrangement of the ultimate inhalant lacunæ would appear to be decidedly characteristic, possibly even affording a character of generic importance, and that in a genus where such characters are greatly needed; but in all the *Halichondrina* the *fundamental* type of canal-system appears to be the same—*i. e.*, according to Vosmaer's third type¹.

The fundamental agreement of the canal-system of *Pachychalina spinosissima* with that of *Halichondria panicea*, a species which I have also had the opportunity of studying carefully with well-preserved material, and its close resemblance even in certain minor details, may perhaps be regarded as an argument (though only of a very general character) in favour of the view that the *Chalininæ* are very intimately related to the *Renierinæ*, and of uniting these two groups as two subfamilies of the same family (*Homorrhaphidæ*, Ridley and Dendy²).

EXPLANATION OF PLATE XLIV.

- Fig. 1. *Pachychalina spinosissima*, seen from the upper surface; natural size.
 2. Portion of a surface-section, showing the arrangement of the pores and the dermal skeleton.
 3. Oxea.

¹ Further details concerning the arrangement of the canal-system in the *Halichondrina* are given by Mr. Ridley and myself in our Report on the Monaxonida dredged by H.M.S. 'Challenger.'

² Ann. & Mag. Nat. Hist. ser. 5, vol. xviii. p. 326; and Report on the Monaxonida dredged by H.M.S. 'Challenger,' p. 1, &c.